[redacted]

Copyright © 1996-1998 Kinetic Strategies Inc. All Rights Reserved.

EXHIBIT D

TO

BELLSOUTH'S NOI COMMENTS

Cable Datacom News

Tracking the Development of High-Speed Cable Data Services

COMMERCIAL CABLE MODEM LAUNCHES IN NORTH AMERICA

Last Updated: August 12, 1998

CABLE MSO/TELCO	LOCATION	VENDOR	NOTES
Adelphia Cable	Coudersport, Pa. Amherst, N.Y. Tonawanda, N.Y Grand Island, N.Y. Mount Lebanon, Pa. Lansdale, Pa. Plymouth, Mass. Adams/North Adams, Mass.	Bay Networks	Two-way Power Link Internet service commercially available for $39.95/month, includes unlimited access and cable modem rental
Adelphia Cable	Palm Beach County, Fla.. Hilton Head Island, S.C. Macedonia, Ohio Blacksburg, Va. Staunton, Va. Winchester, Va. Bethel Park, Pa. West Mifflin, Pa. Plymouth Meeting, Pa. Buffalo, N.Y. Niagara Falls, N.Y.	General Instrument	Telco-return Power Link service available for $34.95/month
Advanced Cable Communications	Coral Springs, Fla.	Com21	ISP Channel service is $49/month
Armstrong Cable Services	Connellsville, Pa.	Bay Networks	Residential Zoom Internet Service is $39.95/month for 500 Kbps downstream and 256 Kbps upstream access
Avenue Cable TV	Ventura, Calif.	Hybrid Networks	Offering Internet Ventures' PeRKInet telco-return cable Internet service for $39.90 per month
Bedford Cablevision	Bedford, Va.	Zenith	CableNet service incldues unlimited Internet access and cable modem rental for

			$39/month
BellSouth	Vestavia Hills. Ala.	Bay Networks	High-speed Internet access, including cable modem rental, is priced at $45/month
BellSouth	Chamblee, Ga.	Bay Networks	High-speed Internet access, including cable modem rental, is priced at $39.95/month
Bresnan Communications	Marquette, Mich.	Bay Networks	Two-way BresnanLink Internet service commercially available for $39.95/month, includes unlimited access and cable modem rental
Cable Atlantic	St. John's, Newfoundland	Zenith	Offering Road Runner and Internet access, including cable modem rental, for C$49.95/month
Cable Regina	Regina, Saskatchewan	Zenith	Cable modem rental and Internet access with up to 2GB of data transfer for C$49.95/month
Cable TV Montgomery	Montgomery County, MD	Com21	Modem rental and unlimited Internet access is $64.95/month
Cable TV Arlington	Arlington, VA	Com21	Modem rental and unlimited Internet access is $64.95/month
Cablevision of Lake Travis	Lake Travis, Texas	Com21	ISP Channel residential service is $69/month
Cablevision of Loudon	Loudon County, Va.	General Instrument, Com21	Commercial deployment of Pulse high-speed Internet service
Cablevision Systems	Oyster Bay, N.Y. Westport, Conn.	Bay Networks	Commercial deployment of Optimum Online Internet Service, unlimited Internet access and cable modem rental is $44.95/month
Cable York	York, Pa.	Bay Networks 3Com	$49.95 per month for two-way BlazeNet Express Internet service, including cable modem rental; telco return service is $29.95 per month with purchase of 3Com modem at retail
Century Communictions	Norwich, N.Y.	Motorola	Road Runner and Internet service available for $39.95/month ($49.95/month for non-cable subs), customer must purchase modem for $199
Charter Communications	Riverside, Calif.	General Instrument	Telco-return Charter Pipeline Internet service available for $44.95/month including modem rental, plus a one-time installation fee

			of $169. Service is offered in partnership with ISP Earthlink Network
Charter Communications	Pasadena, Calif.	Com21	2-way Charter Pipeline Internet service offered with Earthlink; 256 Kbps service is $44.9/5month including modem rental, while 512 Kbps service is $64.95/month
Coast Cablevision	San Mateo, Calif.	Com21	ISP Channel service is $49/month
Coaxial Communications	Columbus, Ohio	General Instrument	Telco-return Internet service available for $34.95/month with purchase of modem for $279; offered with ISP GlobalCenter
COGECO	Quebec and Ontario, Canada	Bay Networks	C$39.95 for unlimited Internet acces and modem rental
COGECO	Burlington, Ontario, Canada	Cisco, Samsung	C$39.95 for unlimited Internet acces and modem rental
Comcast	Baltimore, Md. Sarasota, Fla. Union County, N.J. Detroit, Mich. Philadelphia, Pa. Orange County, Calif.	Motorola	@Home service package offers modem rental and unlimited Internet access for $39.95/month ($59.95/ month for non-cable subs) with a $175 install fee
Conway Corp.	Conway, Ark.	Zenith	Cable Internet service is $39.95 month for unlimited access and modem rental with a $20 install fee
CommuniComm Services	Durant, Okla.	Zenith	Basic residential Presto Internet service is $39.95 month for unlimited access and modem rental, Deluxe service $44.95/month
Cox Communications	Orange County, Calif. Omaha, Neb. Newport News, Va. Oklahoma City, Ok. Providence, R.I.	Motorola	@Home service priced at $44.95 per month for unlimited access and modem rental ($54.95/month for non-cable subs) with a $149 installation fee
Cox Communications	San Diego, Calif.	Motorola	@Home service priced at $39.95 per month ($49.95/month for non-cable subs) with a $149 install fee (including Ethernet NIC)
Cox Communications	Phoenix, Ariz. Meriden, Conn.	Bay Networks	@Home service priced at $44.95 per month for unlimited access and modem rental ($54.95/month for

			non-cable subs) with a $175 installation fee
Cox Communications	Eureka, Calif.	Hybrid Networks	Offering Internet Ventures' PeRKInet telco-return cable Internet service for $41.90 per month
Daniels Cablevision	Encinitas, Calif.	General Instrument	Telco-return I-NET Express service available for $34.95/ month with purchase of modem for $279; offered with ISP GlobalCenter
Fundy Communications	Moncton, New Brunswick	Scientific-Atlanta	Telco-return cable Internet service; consumers purchase modem for C$279
GTE	Clearwater, Fla.	Zenith	Modem rental and unlimited Internet access is $43.90/month ($54.90/month for non-cable subs) with a $125 installation fee
GTE	Ventura, Calif.	Bay Networks	Modem rental is $19.95/month and Internet access is $44.95/month ($59.95/month for non-cable subs)
Halifax Cable	Halifax, Nova Scotia	Com21	High-speed Internet and remote LAN access
Helicon Corp.	Uniontown, Pa. Barre, Vt.	New Media	Telco-return cable Internet service is $29.95 per month ($3 discount for Helicon cable subscribers)
Hibbing Cable TV	Hibbing, Minn.	Com21	"The Bridge" Internet service offered with Befera Interactive Cablenet; residential service is $39.95/month and basic business is $69.95/month
Horizon Cable	Central Michigan	Zenith and Bay Networks	Residential Internet access is $49.90/month for 500-Kbps link
Horizon Cable	Point Reyes, Calif.	3Com	ISP Channel telco-return service is $49/month
InterMedia Partners	Nashville, Tenn.	Motorola	Commercial launch of @Home service
InterMedia Partners	Greenville and Spartanburg, S.C.	Motorola	Commercial launch of @Home service
InterMedia Partners	Kingsport, Tenn.	General Instrument	Launch of telco-return Internet service with Online System Services (OSS); service is $39.95 per month with modem rental
Jones Intercable	Alexandria, Va.	Bay Networks	Jones Internet Channel service is $43.90/ month for unlimited access and

			modem rental with a $125 install fee
Jones Intercable	Prince William County, Va.	Hybrid Networks	Telco-return launch of Jones Internet Channel
Matrix Cable	Los Gatos, Calif.	3Com	Telco-return ISP Channel service is $49/month
Marcus Cable	Highland Park and University Park, Texas	Bay Networks	@Home Internet service priced at $49.95/ month, modem and installation package is $499
MediaOne	Suburban Boston, Mass. Salem, N.H. Suburban Detroit, Mich. Chicago, Ill. Los Angeles, Calif.	Bay Networks	Commercial launch of MediaOne Express service; modem rental and unlimited Internet access is $39.95/month ($49.95/month for non-cable subs) with a $99 install fee
MediaOne	Atlanta, Ga.	Motorola	Commercial launch of MediaOne Express service; modem rental and unlimited Internet access is $39.95/month ($49.95/month for non-cable subs) with a $99 install fee
MediaOne	Chestnut Hill, Mass.	Bay Networks	Commercial deployment of HFC video and data network at Boston College; provides connection to Boston College LAN plus Internet access
MediaOne	Ann Arbor, Mich. Jacksonville, Fla. Broward, County, Fla. Dade County, Fla.	General Instrument	Telco-return MediaOne Express service priced at $34.95/month ($44.95/month for non-cable subs) offers unlimited Internet access and modem rental with $99.95 install charge
Midcontinent Cable	South Dakota	Bay Networks	Modem rental and unlimited Internet access at up to 1.5 Mbps is $39/month
Mountain Cablevision	Hamilton, Ontario	Bay Networks	WAVE service includes modem rental and unlimited Internet access for C$59.60/month
Northern Cable	Sudbury, Ontario	3Com	Telco-return Adesso service priced at C$39.95/month for unlimited Internet access
Palo Alto Cable Co-op	Palo Alto, Calif.	Com21, Hybrid Networks	Commercial deployment of Internet service to homes and businesses with ISP Channel; service starts at $99/month
Prime Cable	Las Vegas, Nev.	Com21	Commercial deployment of ATM-based cable modem service to homes and businesses

Ponderosa Cable	Danville, Calif.	Com21	ISP Channel service is $49/month
Rifkin & Associates	Miami Beach, Fla.	Com21	Cable Internet service offered with Convergence.com
Rifkin & Associates	Gwinnett County, Ga.	Com21	Cable Internet service offered with Convergence.com
Rogers Cablesystems	Metro Toronoto Metro Vancouver Ottawa	Bay Networks and Zenith	WAVE service offers unlimited Internet access and modem rental for C$55/ month
San Bruno Municipal Cable	San Bruno, Calif.	Com21	ISP Channel residential service is $49/month
Service Electric and Blue Ridge Cable	Eastern Pennsylvania	Zenith and Bay Networks	Commercial deployment of Internet services through PenTeleData alliance
Shaw Communications	Calgary Toronto	Motorola	Shaw@Home service offers unlimited Internet access and modem rental for C$39.95/ month
Shaw Communications	Victoria, Canada	Terayon	Shaw@Home service offers unlimited Internet access and modem rental for C$39.95/ month
Suburban Cable	New Castle, Del.	3Com	Modem rental and unlimited Internet access is $54.95/ month for cable subscribers
Sun Country Cable	Los Altos, Calif.	3Com	ISP Channel telco-return service is $49/month
Sun Country Cable	Spokanne, Wash.	Hybrid Networks	Offering Internet Ventures' PeRKInet telco-return cable Internet service for $39 per month
TCA	Bryant and College Station, Texas	Terayon	Modem rental and unlimited Internet access is $49.95/ month for cable subscribers
TCI	Alameda, Calif. Antioch, Calif. Castro Valley, Calif. Dublin, Calif. Fremont, Calif. Hercules, Calif. Livermore, Calif. Petaluma, Calif. Pinole, Calif. Pittsburg, Calif. Pleasanton, Calif. San Ramon, Calif.	Bay Networks, Motorola	@Home service priced at $34.95 per month for unlimited Internet access and cable modem rental with a $150 install fee
TCI	Hartford, Conn.	Bay Networks	@Home service priced at $39.95 per month for unlimited Internet access and cable modem rental
TCI	Denver, Colo.	Com21	Commercial launch of @Home service
TCI	Garland, McKinney and	Motorola	Commercial launch of @Home service

	Stonebridge, Texas		
TCI	Arlington Heights, Ill. Seattle, Wash.	Motorola	@Home service priced at $39.95 per month for unlimited Internet access, cable modem rental
TCI	East Lansing, Mich.	Zenith and Bay Networks	TCI-MET Internet service offers two service tiers for unlimited Internet access: $45/month for shared 4-Mbps connection, $80/month for 10 Mbps
Time Warner Cable	Akron, Canton, Columbus & Youngstown, Ohio Binghamton, Corning, Elmira, Albany, Troy & Saratoga, N.Y. San Diego, Calif. Tampa Bay, Fla. Oahu, Hawaii Memphis, Tenn.	Motorola	Road Runner service priced at $39.95 per month for unlimited Internet access, modem rental, specialized Time Warner and local content ($44.95 in San Diego)
Time Warner Cable	Portland, Maine El Paso, Texas	Toshiba	Road Runner service is $39.95 per month for unlimited home access and modem rental
US West Communications	Omaha, Neb.	Bay Networks	Service priced at $49.95/ month for Internet access and cable modem rental ($59.95/month for non-cable subs) with a $125 installation fee
Videotron	Montreal Alberta	Motorola	Commercial launch of high-speed Internet services; Montreal deployment includes InfiniT content service
Videon Cable TV	Winnipeg, Manitoba	Bay Networks	WAVE service includes modem rental and unlimited Internet access for C$54.95/month
Western Coaxial	Hamilton, Ontario	Bay Networks	WAVE service includes modem rental and unlimited Internet access for C$55/month
Westman Media	Brandon, Manitoba	Bay Networks	WAVE service includes modem rental and unlimited Internet access for C$54.95/month

New broadband revenue streams for small-to-mid sized cable operations at *NO COST*

Cable Datacom News is published by **Kinetic Strategies Inc.**, Phoenix, Arizona USA.
Copyright © 1996-1998 Kinetic Strategies Inc. All Rights Reserved.

Cable Datacom News

Tracking the Development of High-Speed Cable Data Services

SELECT CABLE MODEM MARKET TRIALS IN NORTH AMERICA

Last Updated: June 20, 1998

CABLE MSO/TELCO	LOCATION	VENDORS	NOTES
Charter Communications	St. Louis, Mo.	3Com	Internet trial with telco-return cable modems
Charter Communications	Newman, Ga.	Scientific-Atlanta	Internet trial with telco-return cable modems
Cox Communications	Gainesville, Fla.	3Com	Internet trial with telco-return cable modems
Fanch Communications	Murray, Ky.	Com21	Technical trial of cable data services
Fanch Communications	Bolling Green, Ohio	Motorola	Trial of Road Runner cable Internet service
Insight Communications	Indianapolis, Ind.	3Com	Internet trial with telco-return cable modems
Marcus Cable	Eau Caire, Wis.	Com21	Cable Internet market trial with HSA Corp.
MCI	Sergeant Bluff, Iowa	Com21	Technical trial of cable data services in partnership with Northwest Iowa Telephone Company
Media General Cable	Fairfax, Va.	Bay Networks	Internet access trial with 35 small office/home office (SOHO) users
TCA Cable	Amarillo, Texas	Terayon	Trial of high-speed cable data services
Time Warner Cable	Litchfield, Conn.	Toshiba	Field trial of MCNS DOCSIS cable modems
Western ShoreCable TV	St. Mary's County, Md.	Bay Networks	Trial of high-speed cable data services with HSA Corp.

Cable Datacom News is published by **Kinetic Strategies Inc.**, Phoenix, Arizona USA.

[redacted]

Copyright © 1996-1998 Kinetic Strategies Inc. All Rights Reserved.

EXHIBIT E

TO

BELLSOUTH'S NOI COMMENTS

Cable Datacom News

Tracking the Development of High-Speed Cable Data Services

WIRELESS CABLE MODEM TRIALS AND COMMERCIAL LAUNCHES IN NORTH AMERICA

Last Updated: August 12, 1998

WIRELESS OPERATOR or ISP	LOCATION	VENDOR	NOTES
American Telecasting	Colorado Springs and Denver, Colo.	Hybrid Networks	Commercial launch of WANTWeb high-speed MMDS Internet service with Online System Services (OSS); residential package is $69.95 for unlimited access, user must buy modem for $400
American Telecasting	Portland, Ore. and Seattle, Wash.	Hybrid Networks	Commercial launch of WANTWeb high-speed MMDS Internet service with Online System Services (OSS)
CAI Wireless	Rochester, N.Y.	Hybrid Networks	Commercial launch of high-speed Internet service in MMDS band; residential package is $49.95 for unlimited access and modem rental
CAI Wireless	New York, N.Y.	General Instrument	Commercial launch of high-speed Internet service in MMDS band; residential package is $49.95 for unlimited access and modem rental
CAI Wireless	Boston, Mass.	General Instrument	High-speed Internet trial using MMDS spectrum
CAI Wireless	Washington, DC	Hybrid	High-speed Internet trial using MMDS spectrum
CellularVision USA	New York, N.Y.	New Media Communication	Commercial high-speed Internet service offered in LMDS spectrum; residential 500-Kbps package is $49.95 for unlimited usage plus $199 install fee
CS Wireless	Dallas, Texas	Hybrid, General Instrument	Commercial launch of "The Beam" high-speed Internet service in MMDS band
			Commercial high-speed

DirectNET	Ft. Lauderdale, Fla.	Hybrid	Internet service offered in MDS spectrum band; SOHO package is $195/month plus $395 install fee
GoFast	Minneapolis, Minn.	Hybrid	High-speed Internet trial using ITFS spectrum
Heartland Wireless	Sherman, Texas	Hybrid	Commercial launch of HeartNet Internet service offered in MMDS spectrum band
Metro.Net	Las Vegas, Nev.	Hybrid	Commercial high-speed Internet service offered in MDS spectrum band
QuadraVision	Reno, Sparks and Carson City, Nev.	Hybrid	Commercial launch of WirelessExpress Internet Services (WIRX) with Online System Services; prices start at $49.95 per month
People's Choice TV	Phoenix, Ariz.	Hybrid	Commercial launch of SpeedChoice Internet service; priced at $49/month
People's Choice TV	Detroit, Mich.	Hybrid, General Instrument	High-speed Internet trial using MMDS spectrum
Third Rail Communications	Nashua, N.H.	Integrity	Deployment of two-way MMDS data services
WavePath	San Francisco and San Jose, Calif.	Hybrid	Commercial launch of two-way I-Speed Internet service
Wireless One	Baton Rouge, La. Jackson, Miss.	Hybrid	Commercial launch of two-way WarpOne Internet Service; prices start at $450 per month for 256-Kbps access increasing to $1,250 per month for 1.54 Mbps

Empowering

Cable Datacom News is published by **Kinetic Strategies Inc.**, Phoenix, Arizona USA.
Copyright © 1996-1998 Kinetic Strategies Inc. All Rights Reserved.

EXHIBIT F

TO

BELLSOUTH'S NOI COMMENTS

U.S. Packet/Cell-Based Services Market Share and Forecast, 1996–2001

Analyst: Melanie A. Posey

Check us out on the World Wide Web!
http://www.idcresearch.com

Quoting IDC Information and Data: *Internal Documents and Presentations*—Quoting individual sentences and paragraphs for use in your company's internal communications does not require permission from IDC. The use of large portions or the reproduction of any IDC document in its entirety does require prior written approval and may involve some financial consideration. *External Publication*—Any IDC information that is to be used in advertising, press releases, or promotional materials requires prior written approval from the appropriate IDC Vice President or Country Manager. A draft of the proposed document should accompany any such request.

Copyright 1997 International Data Corporation. **Reproduction is forbidden unless authorized.**
For additional copies please contact Cheryl Toffel, 508-935-4389.

Printed on recycled materials.

Table of Contents

Page

Executive Summary 1
- Frame Relay 1
- ATM Services 2
- X.25 Services 3
- SMDS 3

Scope and Methodology 5
- Scope 5
- Market Segment Definitions 5
- Methodology 7

Packet/Cell-Based Services Market Overview 9
- Market Share, Midyear 1997 and Yearend 1996 9
- Revenue Forecast, 1996–2001 11
- Customer Connection Forecast, 1996–2001 12
- Revenue Forecast by Customer Segment, 1996–2001 15
- National/International Revenue Forecast by Region, 1996–2001 17

Frame Relay Services 19
- Market Forecast Assumptions 23
- Segmentation Analysis: Local and National/International Market 26

ATM Services 41
- Market Forecast Assumptions 45
- Segmentation Analysis: Local and National/International Market 46

X.25 Services 59
- Market Forecast Assumptions 63
- Segmentation Analysis: Local and National/International Market 63

SMDS 77
- Market Forecast Assumptions 80
- Segmentation Analysis: Local and National/International Market 81

Service Provider Profiles 93
- Local/Regional Carriers 93
- Interexchange Carriers 105
- Value-Added Network Providers 120

List of Tables

Table		Page
1	U.S. Providers' Packet/Cell-Based Service Offerings, Midyear 1997	9
2	U.S. Packet/Cell-Based Service Revenue by Segment, 1996–2001	13
3	U.S. Packet/Cell-Based Service Port Installed Base by Segment, 1996–2001	14
4	U.S. Packet/Cell-Based Service Revenue by Customer Type, 1996–2001	16
5	U.S.-Based National/International Packet/Cell-Based Service Revenue by Region, 1996–2001	17
6	U.S. Frame Relay Customers and Port Installed Base, 1996–2001	20
7	U.S. Frame Relay Port Installed Base by Access Speed, 1996–2001	21
8	U.S. Frame Relay Service Revenue by Customer Type, 1996–2001	22
9	U.S. Local Frame Relay Customers and Port Installed Base, 1996–2001	31
10	U.S. Local Frame Relay Port Installed Base Share by Access Speed, 1996–2001	32
11	U.S. Local Frame Relay Service Revenue Share by Customer Type, 1996–2001	32
12	U.S.-Based National/International Frame Relay Customers and Port Installed Base, 1996–2001	37
13	U.S.-Based National/International Frame Relay Port Installed Base Share by Access Speed, 1996–2001	37
14	U.S.-Based National/International Frame Relay Service Revenue Share by Customer Type, 1996–2001	38
15	U.S.-Based National/International Frame Relay Service Revenue by Region, 1996–2001	39
16	U.S. ATM Customers and Port Installed Base, 1996–2001	42
17	U.S. ATM Port Installed Base by Access Speed, 1996–2001	42
18	U.S. ATM Service Revenue by Customer Type, 1996–2001	43
19	U.S. Local ATM Customers and Port Installed Base, 1996–2001	51
20	U.S. Local ATM Port Installed Base Share by Access Speed, 1996–2001	51
21	U.S. Local ATM Service Revenue Share by Customer Type, 1996–2001	52
22	U.S.-Based National/International ATM Customers and Port Installed Base, 1996–2001	56
23	U.S.-Based National/International ATM Port Installed Base Share by Access Speed, 1996–2001	57

List of Tables — Continued

Table		Page
24	U.S.-Based National/International ATM Service Revenue Share by Customer Type, 1996–2001	57
25	U.S. X.25 Customers and Port Installed Base, 1996–2001	60
26	U.S. X.25 Connection Share by Port Type, 1996–2001	60
27	U.S. X.25 Dedicated Connections by Access Speed, 1996–2001	61
28	U.S. X.25 Service Revenue by Customer Type, 1996–2001	62
29	U.S. Local X.25 Customers and Port Installed Base, 1996–2001	69
30	U.S. Local X.25 Connection Share by Port Type, 1996–2001	70
31	U.S. Local X.25 Dedicated Port Installed Base Share by Access Speed, 1996–2001	70
32	U.S. Local X.25 Service Revenue Share by Customer Type, 1996–2001	70
33	U.S.-Based National/International X.25 Customers and Port Installed Base, 1996–2001	73
34	U.S.-Based National/International X.25 Connection Share by Port Type, 1996–2001	73
35	U.S.-Based National/International X.25 Dedicated Port Installed Base Share by Access Speed, 1996–2001	74
36	U.S.-Based National/International X.25 Service Revenue Share by Customer Type, 1996–2001	74
37	U.S.-Based National/International X.25 Service Revenue by Region, 1996–2001	75
38	U.S. SMDS Customers and Port Installed Base, 1996–2001	78
39	U.S. SMDS Port Installed Base by Access Speed, 1996–2001	78
40	U.S. SMDS Service Revenue by Customer Type, 1996–2001	79
41	U.S. Local SMDS Customers and Port Installed Base, 1996–2001	87
42	U.S. Local SMDS Port Installed Base Share by Access Speed, 1996–2001	87
43	U.S. Local Service Revenue Share by Customer Type, 1996–2001	88
44	U.S.-Based National/International SMDS Customers and Port Installed Base, 1996–2001	89
45	U.S.-Based National/International SMDS Port Installed Base Share by Access Speed, 1996–2001	90
46	U.S.-Based National/International SMDS Services Revenue Share by Customer Type, 1996–2001	90

List of Tables — Continued

Table		Page
47	U.S.-Based National/International SMDS Service Revenue by Region, 1996–2001	91
48	Bell Atlantic's Frame Relay Pricing by Type of Charge	95
49	Bell Atlantic's ATM Pricing	95
50	BellSouth Frame Relay Pricing by Connection Speed	97
51	Pacific Bell FasTrak Frame Relay Pricing	99
52	Pacific Bell's SMDS Pricing by Connection Speed	101
53	Southwestern Bell's ATM Service Pricing	102
54	AT&T's Data Network Services by Old and New Names	105
55	AT&T's Domestic Frame Relay Pricing	107
56	AT&T's ATM SVC Pricing by Connection Speed	108
57	AT&T's ATM PVC Pricing	109
58	Cable & Wireless's Frame Relay Pricing by Port Speed	110
59	Selected LDDS WorldCom NNI LEC Agreements by LATA	112
60	MCI Frame Relay Port Pricing by Speed	115
61	MCI's Frame Relay Fixed-Rate PVC Pricing	115
62	Sprint Frame Relay Port Pricing by Speed	118

List of Figures

Figure		Page
1	Total U.S. Packet/Cell-Based Service Revenue by Provider, Midyear 1997	10
2	Total U.S. Packet/Cell-Based Service Revenue by Provider, Yearend 1996	11
3	Total U.S. Packet/Cell-Based Service Revenue, 1996–2001	12
4	U.S. Packet/Cell-Based Service Revenue Share by Segment, 1996 and 2001	13
5	Total U.S. Packet/Cell-Based Port Installed Base, 1996–2001	14
6	U.S. Packet/Cell-Based Port Installed Base Share by Segment, 1996 and 2001	15
7	U.S. Packet/Cell-Based Service Revenue Share by Customer Type, 1996 and 2001	16
8	U.S.-Based National/International Packet/Cell-Based Service Revenue Share by Region, 1996 and 2001	18
9	U.S. Frame Relay Service Revenue, 1996–2001	19
10	U.S. Frame Relay Port Installed Base Share by Access Speed, 1996 and 2001	20
11	U.S. Frame Relay Service Revenue Share by Customer Type, 1996 and 2001	22
12	U.S. Frame Relay Service Revenue Share by Provider Segment, 1996 and 2001	26
13	U.S. Frame Relay Customer Share by Provider Segment, 1996 and 2001	27
14	U.S. Frame Relay Port Installed Base Share by Provider Segment, 1996 and 2001	28
15	U.S. Local Frame Relay Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	29
16	U.S. Local Frame Relay Service Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	30
17	U.S. Local Frame Relay Service Revenue, 1996–2001	31
18	U.S.-Based National/International Frame Relay Service Revenue Share by Provider, Midyear 1997	34
19	U.S.-Based National/International Frame Relay Service Revenue Share by Provider, Yearend 1996	34
20	U.S.-Based National/International Frame Relay Port Installed Base Share by Provider, Midyear 1997	35
21	U.S.-Based National/International Frame Relay Port Installed Base Share by Provider, Yearend 1996	36
22	U.S.-Based National/International Frame Relay Service Revenue, 1996–2001	36

List of Figures — Continued

Figure		Page
23	U.S.-Based National/International Frame Relay Service Revenue Share by Region, 1996 and 2001	40
24	U.S. ATM Service Revenue, 1996–2001	41
25	U.S. ATM Port Installed Base Share by Access Speed, 1996 and 2001	43
26	U.S. ATM Service Revenue Share by Customer Type, 1996 and 2001	44
27	U.S. ATM Service Revenue Share by Provider Segment, 1996 and 2001	46
28	U.S. ATM Customer Share by Provider Segment, 1996 and 2001	47
29	U.S. ATM Port Installed Base Share by Provider Segment, 1996 and 2001	48
30	U.S. Local ATM Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	49
31	U.S. Local ATM Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	50
32	U.S. Local ATM Service Revenue, 1996–2001	51
33	U.S.-Based National/International ATM Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	54
34	U.S.-Based National/International ATM Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	55
35	U.S.-Based National/International ATM Service Revenue, 1996–2001	56
36	U.S. X.25 Service Revenue, 1996–2001	59
37	U.S. X.25 Dedicated Connection Share by Access Speed, 1996 and 2001	61
38	U.S. X.25 Service Revenue Share by Customer Type, 1996 and 2001	62
39	U.S. X.25 Service Revenue Share by Provider Segment, 1996 and 2001	64
40	U.S. X.25 Customer Share by Provider Segment, 1996 and 2001	65
41	U.S. X.25 Connection Share by Provider Segment, 1996 and 2001	66
42	U.S. Local X.25 Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	67
43	U.S. Local X.25 Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	68
44	U.S. Local X.25 Service Revenue, 1996–2001	69
45	U.S.-Based National/International X.25 Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	71

List of Figures — Continued

Figure		Page
46	U.S.-Based National/International X.25 Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	72
47	U.S.-Based National/International X.25 Service Revenue, 1996–2001	73
48	U.S.-Based National/International X.25 Service Revenue Share by Region, 1996 and 2001	76
49	U.S. SMDS Service Revenue, 1996–2001	77
50	U.S. SMDS Port Installed Base Share by Access Speed, 1996 and 2001	79
51	U.S. SMDS Service Revenue Share by Customer Type, 1996 and 2001	80
52	U.S. SMDS Service Revenue Share by Provider Segment, 1996 and 2001	82
53	U.S. SMDS Customer Share by Provider Segment, 1996 and 2001	83
54	U.S. SMDS Port Installed Base Share by Provider Segment, 1996 and 2001	84
55	U.S. Local SMDS Service Revenue Share by Provider, Midyear 1997 and Yearend 1996	85
56	U.S. Local SMDS Port Installed Base Share by Provider, Midyear 1997 and Yearend 1996	86
57	U.S. Local SMDS Services Revenue, 1996–2001	87
58	U.S.-Based National/International SMDS Service Revenue, 1996–2001	89
59	U.S.-Based National/International SMDS Service Revenue Share by Region, 1996 and 2001	92

Abstract

U.S. Packet/Cell-Based Services Market Share and Forecast, 1996–2001

This report analyzes the market for the following packet/cell-based services: frame relay, asynchronous transfer mode (ATM), X.25, and switched multimegabit data service (SMDS). It quantifies and forecasts the local and national/international revenue of U.S.-based telecommunications service providers. It includes yearend 1996 and midyear 1997 market share by revenue and ports for each service segment and 1996–2001 revenue and port forecasts for each service segment. Specific assumptions related to the development of each market segment are included for the local and national markets.

Executive Summary

The total U.S. market for packet/cell-based services (frame relay, ATM, X.25, and SMDS) will reach nearly $3.3 billion by yearend 1997, representing a growth rate of 64% from 1996's total of approximately $2.0 billion. IDC forecasts that the total packet/cell-based services market will grow to more than $10.5 billion in 2001.

Overall, the market is being driven by the increasing connectivity requirements of businesses, government and educational institutions, and network service providers. More specifically, developments such as new customer growth, expansion of existing customers' networks, the impact of new types of customers such as ISPs, and customer migration between different data services — in particular, away from private lines — are fueling the growth of the packet/cell-based services market.

Frame relay is the single largest service segment of the overall packet/cell-based services market and will remain so during the forecast period as the service matures and is perceived as more of a mass-market business offering. ATM will also become a more important segment of the overall data services market. The relative position of X.25 is due to customer migration to other technologies and continued pricing pressure on X.25 services. IDC expects SMDS to remain a niche service.

Sprint leads the overall shared data services market, followed by AT&T and MCI. From yearend 1996 to midyear 1997, Sprint lost market share, primarily to MCI and AT&T, but Sprint remains in first place overall because of its dominance of the X.25 market and its strong showing in the ATM market. Among local providers, U S West is the market leader, primarily a result of its commanding lead in the local frame relay market.

Frame Relay

The market for frame relay services will nearly double between 1996 and 1997 and will expand at a 1996–2001 CAGR of 46%. The following factors will affect the growth of frame relay services:

- Initially, frame relay met the largely unfulfilled market demand for an efficient LAN-to-LAN interconnection service. This market is reaching saturation, but increasing customer requirements (in terms of both bandwidth and interconnection of additional sites) will continue to drive demand.
- During the forecast period, LAN-to-SNA applications will be the major market driver for frame relay services as corporations seek to integrate SNA traffic from their legacy systems with LAN-based traffic. Carriers are encouraging this trend by offering a wider variety of managed frame relay assembler/disassembler (FRAD) solutions and through the introduction of permanent virtual circuit (PVC) prioritization.